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PATENT APPLICATION
Mo-6931
LeA 35,798

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF	
WOLFGANG BRAUER ET AL	GROUP NO.: 1711
SERIAL NUMBER: 10/043,738	EXAMINER: R. A. SERGENT
FILED: JANUARY 9, 2002	
TITLE: CONTINUOUS PRODUCTION OF THERMOPLASTIC POLYURETHANE ELASTOMERS	

LETTER

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed herewith are three copies of an Appeal Brief in the matter of the subject Appeal. Please charge the fee for filing the Brief, $330.00, to our Deposit Account Number 13-3848.

Respectfully submitted

By _____
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an enveloped addressed to: Commissioner for Patents, Alexandria, VA 22313-1450 7/22/04
Date
James R. Franks, Reg. No. 42,552
Name of appellant, assignee or Registered Representative
_____
Signature
July 22, 2004
Date

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GROUP NO.: 1711

EXAMINER: R. A. SERGENT

APPEAL BRIEF

Assistant Commissioner for Patents
Washington, D.C. 20231
Sir:

This Brief, submitted in triplicate, is an appeal from the Final Office Action dated March 4, 2004, and an Advisory Action dated May 3, 2004 of the Examiner in which the rejections of Claims 5 and 7-11 were maintained.

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I. REAL PARTY IN INTEREST

The real party in interest is Bayer AG.

II. RELATED APPEALS AND INTERFERENCES

There are no other related appeals or interferences known to Appellants, Appellants' legal representative, or Appellants' assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in this pending appeal.

III. STATUS OF THE CLAIMS

Claims Pending:	5 and 7-11
Claims Canceled:	None
Claims Allowed:	None
Claims Withdrawn from Consideration:	None
Claims Appealed:	5 and 7-11

IV. STATUS OF AMENDMENTS

An amendment under 37 C.F.R. §1.116 was filed subsequent to the Final Rejection of March 4, 2004. The after-final amendments to Claim 7 were entered by the Examiner as indicated in the Advisory Action of May 3, 2004, which is noted with appreciation by Appellants.

V. SUMMARY OF THE INVENTION

The present invention is directed to a continuous process of preparing a thermoplastic polyurethane elastomer consisting of:

(i) forming a prepolymer, at a temperature of 130°C to 250°C, in a reactor selected from the group consisting of a stirred tube reactor and at least one static mixer, by introducing into said reactor,

A) at least one polyether diol having a number average molecular weight (Mn) of 450 to 10,000, and 1.8 to 2.2 Zerewitinoff active hydrogen atoms on average, said polyether diol being preheated to a temperature of 130°C to 230°C prior to introducing said polyether diol into said reactor,

B) at least one organic diisocyanate, said organic diisocyanate being preheated to a temperature of 50°C to 150°C prior to introducing said organic diisocyanate into said reactor, and

10 to 1000 ppm in relation to A) of tin dioctoate as a catalyst; and

(ii) reacting, in an extruder at a temperature of 130°C to 250°C, said prepolymer with,

C) 1,4-di-(2,2'-hydroxyethyl)-hydroquinone, the 1,4-di-(2,2'-hydroxyethyl)-hydroquinone being preheated to a temperature of 130°C to 230°C prior to introducing the 1,4-di-(2,2'-hydroxyethyl)-hydroquinone into said extruder,

thereby forming said thermoplastic polyurethane elastomer,

with the proviso that the NCO/OH ratio of the reactants A), B) and C) is 0.85 to 1.2, and said thermoplastic polyurethane has a glass transition temperature (Tg) below 50°C,

wherein said thermoplastic polyurethane elastomer optionally comprises at least one auxiliary substance.

VI. ISSUES

(I) Whether any of Claims 5 and 7-11 are unpatentable under 35 U.S.C. §103(a) over United States Patent No. 3,901,852 (**Shah**) in view of United States Patent No. 5,905,133 (**Müller et al**).

VII. GROUPING OF CLAIMS

Claims 5 and 7-11 are appealed together, and stand or fall together.

VIII. ARGUMENTS

(I) CLAIMS 5 AND 7-11 ARE NOT RENDERED OBVIOUS BY SHAH IN VIEW OF MÜLLER ET AL.

The Examiner has taken the position that, under 35 U.S.C. §103(a), Claims 5 and 7-11 are unpatentable over Shah in view of Müller et al. Appellants respectfully disagree with regard to Claims 5 and 7-11.

Shah discloses the preparation of a thermoplastic polyurethane by means of a continuous one-shot procedure, in which all of the reactants are reacted at the same time, rather than in stages (column 4, lines 4-7). Shah discloses reacting the reactants in suitable molds or extrusion equipment (column 4, lines 35-36). Shah discloses in general terms the preparation of thermoplastic polyurethane by a prepolymer method, which Shah describes as being "less preferred" (column 5, lines 3-8).

The examples of Shah make use of a one-shot method, and not a prepolymer method. In the examples of Shah, the TPU's are prepared by: degassing a mixture of glycol and hydroquinone bis(2-hydroxyethylether) at a temperature of 110°C; addition of catalyst and di-isocyanate thereto; brief high speed mechanical mixing; and pouring of the reactive mixture into a shallow aluminum tray. See column 6, lines 5-16 of Shah. It is important to note that degassing a mixture of glycol and hydroquinone bis(2-hydroxyethylether) at a temperature of 110°C can not result in the formation of a prepolymer, as both components have hydroxyl functionality only. The catalyst and di-isocyanate are added after the degassing step. In the examples of Shah, no appreciable polymerization occurs until after all of the components are finally mixed together.

It is respectfully submitted that Shah's cursory and disparaging reference to a prepolymer process, coupled with his emphasis upon a continuous one-shot method of preparing thermoplastic polyurethanes would reasonably discourage a skilled artisan from pursuing a prepolymer process. "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994).

Müller et al disclose a 6-step process for the continuous preparation of TPU's (abstract). More particularly, the 6-step process of Müller et al involves:

(A) mixing a polyol and an organic di-isocyanate;

(B) forming a prepolymer from the mixture of step-(A), e.g., in a tubular reactor;

(C) mixing the prepolymer of step (B) with additional organic di-isocyanate;

(D) cooling the prepolymer / di-isocyanate mixture of step (C);

(E) mixing the cooled prepolymer / di-isocyanate mixture of step (D) with diol and optionally triol and/or diamine; and

(F) reacting continuously the mixture of step (E), e.g., in an extruder, to form the TPU.

See the abstract; column 2, lines 37-65; column 5, lines 48-55; and column 6, lines 18-20 of Müller et al.

Shah may reasonably be deemed to teach away from the use of a prepolymer method of TPU preparation. Müller et al discloses a very detailed 6-step prepolymer method for preparing TPU's. As such, neither Shah nor Müller et al provide the requisite disclosure that would reasonably motivate a skilled artisan to combine or otherwise modify their disclosures to arrive at Appellants' claimed process.

As the Court of Appeals for the Federal Circuit has stated, there are three possible sources for motivation to combine references in a manner that would render claims obvious. These are: (1) the nature of the problem to be solved; (2) the teaching of the prior art; and (3) the knowledge of persons of ordinary skill in the art, *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1458 (Fed. Cir. 1998). The nature of the problem to be solved and the knowledge of persons of ordinary skill in the art are not present here and have not been relied upon in the rejection. As for the teaching of the prior art, the above discussion has established that neither of the patents relied upon in the rejection provide the requisite teaching, and certainly do not provide the motivation or suggestion to combine that is required by Court decisions.

Even if Shah and Müller et al were combined, Appellants' claimed process would not result from such combination. Shah discloses a one-shot method of TPU preparation, and teaches away from a prepolymer method of TPU preparation. Müller et al discloses a detailed 6-step prepolymer method of TPU preparation that

includes three (3) separate steps between the prepolymer formation step (B) and the final TPU formation step (F). The method of Appellants' present claims is a two-stage continuous process in which the prepolymer formed in step (i) is then reacted in a second stage (ii) in an extruder with 1,4-di-(2,2'-hydroxyethyl)-hydroquinone.

Appellants wish to point out that the transitional language of their present sole independent Claim 7 is closed-ended (i.e., "consisting of"), which is exclusive of intervening steps between steps (i) and (ii). On page 2 of the Advisory Action of May 3, 2004, it is argued that the minimization or elimination of Müller et al's steps (C) and (D) would have been obvious to a skilled artisan. Appellants respectfully disagree. Müller et al do not disclose or suggest that steps (C) and (D) of their process are optional. Müller et al provide no disclosure, teaching or suggestion as to minimizing or eliminating steps (C) and (D) from their process. "The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984). Modifying "prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability -- the essence of hindsight." *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999)

It is respectfully submitted that the rejection impermissibly uses the present application as a blueprint for selecting and combining or modifying the cited references to arrive at Appellants' claimed invention, thereby making use of prohibited hindsight in the selection and application of those references. "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W.L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 1075 (Fed. Cir. 1988).

In light of the preceding remarks, Appellants' Claims 5 and 7-11 are deemed to be patentable over Shah in view of Müller et al.

In view of the remarks herein, Appellants' respectfully submit that their claimed continuous process for preparing a thermoplastic polyurethane elastomer is not described, taught or fairly suggested by Shah in view of Müller et al. Thus, Appellants respectfully request that the Board of Appeals reverse the decision of the Examiner, and remand the application for allowance of Claims 5 and 7-11 and issuance of a patent.

Respectfully submitted,

By _____
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APPENDIX

CLAIMS ON APPEAL

5. The thermoplastic polyurethane elastomer prepared in accordance with the process of Claim 7.

7. A continuous process of preparing a thermoplastic polyurethane elastomer consisting of:

(i) forming a prepolymer, at a temperature of 130°C to 250°C, in a reactor selected from the group consisting of a stirred tube reactor and at least one static mixer, by introducing into said reactor,

A) at least one polyether diol having a number average molecular weight (Mn) of 450 to 10,000, and 1.8 to 2.2 Zerewitinoff active hydrogen atoms on average, said polyether diol being preheated to a temperature of 130°C to 230°C prior to introducing said polyether diol into said reactor,

B) at least one organic diisocyanate, said organic diisocyanate being preheated to a temperature of 50°C to 150°C prior to introducing said organic diisocyanate into said reactor, and

10 to 1000 ppm in relation to A) of tin dioctoate as a catalyst; and

(ii) reacting, in an extruder at a temperature of 130°C to 250°C, said prepolymer with,

C) 1,4-di-(2,2'-hydroxyethyl)-hydroquinone, the 1,4-di-(2,2'-hydroxyethyl)-hydroquinone being preheated to a temperature of 130°C to 230°C prior to introducing the 1,4-di-(2,2'-hydroxyethyl)-hydroquinone into said extruder,

thereby forming said thermoplastic polyurethane elastomer,

with the proviso that the NCO/OH ratio of the reactants A), B) and C) is 0.85 to 1.2, and said thermoplastic polyurethane has a glass transition temperature (Tg) below 50°C,

wherein said thermoplastic polyurethane elastomer optionally comprises at least one auxiliary substance.

8. The continuous process of Claim 7 wherein said reactor of step (i) comprises at least two static mixers, said static mixers being arranged in series.

9. The continuous process of Claim 7 wherein said auxiliary substance is selected from the group consisting of dyes, pigments, flame proofing agents, reinforcing agents, hydrolysis stabilizers, light stabilizers, heat stabilizers, softeners, anti-blocking agents, lubricants, mold-release agents, fungicides, bactericides, inorganic fillers, organic fillers, thermoplastic polymers and combinations thereof.

10. The continuous process of Claim 7 wherein steps (i) and (ii) together have a total reaction time of from 0.3 to 3 minutes.

11. The continuous process of Claim 10 wherein said total reaction time is 0.5 to 2 minutes.